WE CLAIM:

1. A trench isolation method comprising:

forming a trench in a semiconductor substrate using a mask pattern defining an active area;

sequentially stacking an oxide layer and a nitride pad layer on the sidewall of the trench and forming an insulation layer in the trench;

removing the mask pattern down to the upper surface of the semiconductor substrate of the active area; and

forming a capping layer of an insulating material, the capping layer filling a recess at the upper edge of the trench, the recess generated by etching the nitride pad layer formed on the sidewalls of the trench during removing the mask pattern.

2. The trench isolation method of claim 1, wherein the mask pattern is formed of a nitride layer.

3. The trench isolation method of claim 1, wherein the oxide layer is a thermal oxide layer formed by a thermal process.

4. The trench isolation method of claim 3, wherein the thickness of the thermal oxide layer is formed to be 50 - 250Å.

5. The trench isolation method of claim 1, wherein the pad nitride layer is formed by low pressure chemical vapor deposition (LPCVD).

6. The trench isolation method of claim 5, wherein the thickness of the pad nitride layer is formed to be 50 - 250Å.

7. The trench isolation method of claim 1, wherein forming an insulation layer comprises:

filling the inside of the trench with an insulating material; and

planarizing the resultant structure in which the insulating material is formed using the mask pattern defining the active area as a planarizing stopper.

8. The trench isolation method of claim 1, wherein the removing of the mask pattern is performed by wet-etching.

9. The trench isolation method of claim 1, wherein the capping layer is formed by forming an insulating material by self epitaxial growth (SEG), and then removing the insulating material layer down to the upper surface of the semiconductor substrate of the active area so that only the insulating material layer filled in the recess is exposed.

10. The trench isolation method of claim 1, further comprising forming a second oxide layer, wherein the second oxide layer is formed on the nitride pad layer before the insulation layer is formed in the trench.

11. The trench isolation method of claim 1, wherein forming a capping layer of an insulating material comprises:

forming an insulating material layer for burying the recess in the entire surface of the resultant substrate; and

forming a capping layer filling the recess by removing the insulating material layer down to the upper portion of the isolation layer and the upper surface of the semiconductor substrate so that only the insulating material layer filling the recess is exposed.

12. The trench isolation method of claim 11, wherein the insulating material layer burying the recess is formed by chemical vapor deposition (CVD).

13. The trench isolation method of claim 12, wherein the insulating material layer comprises a material selected from a group consisting of an oxide, a nitride, and an oxynitride.

14. The trench isolation method of claim 11, wherein the forming of a capping layer filling the recess is performed by dry-etching.

15. A trench isolation method comprising:

forming a trench in a semiconductor substrate using a mask pattern defining an active area;

sequentially stacking a first oxide layer, a nitride pad layer and a second oxide layer on the sidewall of the trench and forming an isolation layer in the trench;

removing the mask pattern to expose the upper surface of the semiconductor substrate of the active area; and

forming a capping layer of an insulating material, the capping layer filling a recess at the upper edge of the trench recess generated by etching the nitride pad layer formed on the sidewalls of the trench during removal of the mask pattern.

16. The trench isolation method of claim 15, wherein the mask pattern is formed of a nitride.

17. The trench isolation method of claim 15, wherein the first oxide layer is a thermal oxide layer formed by a thermal process.

18. The trench isolation method of claim 17, wherein the thickness of the first thermal oxide layer is formed to be 50 - 250Å.

19. The trench isolation method of claim 15, wherein the pad nitride layer is formed by LPCVD.

20. The trench isolation method of claim 19, wherein the thickness of the pad nitride layer is formed to be 50 - 250Å.

21. The trench isolation method of claim 15, wherein the second oxide layer is a thermal oxide layer formed by a thermal process.

22. The trench isolation method of claim 21, wherein the thickness of the second thermal oxide layer is formed to be 50 - 250Å.

23. The trench isolation method of claim 15, wherein the forming of an isolation layer in the trench comprises:

filling the inside of the trench with an insulating material; and

planarizing the resultant structure in which the insulating material is formed using the mask pattern defining the active area as a planarizing stopper.

24. The trench isolation method of claim 15, wherein the removing of the mask pattern is performed by wet-etching.

25. The trench isolation method of claim 15, wherein the capping layer is formed by forming an insulating material layer by self epitaxial growth (SEG), and then removing the insulating material layer down to the upper surface of the semiconductor substrate of the active area so that only the insulating material layer filled in the recess is exposed.

26. The trench isolation method of claim 15, wherein forming a capping layer of an insulating material comprises:

forming an insulating material layer for burying the recess on the entire surface of the resultant substrate; and

forming a capping layer filling the recess by removing the insulating material layer down to the upper portion of the isolation layer and the upper surface of the semiconductor substrate so that only the insulating material layer filling the recess is exposed.

27. The trench isolation method of claim 26, wherein the insulating material layer burying the recess is formed by CVD.

28. The trench isolation method of claim 27, wherein the insulating material layer comprises a material selected from a group consisting of an oxide, a nitride, and an oxynitride.

29. The trench isolation method of claim 26, wherein the forming of a capping layer filling the recess is performed by dry-etching.